

MARINE REVIEW.

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Marine Engineers' Bill Passed.

Every licensed officer of the merchant marine service in the United States has reason to congratulate President Geo. Uhler and his brother officers of the Marine Engineers' Beneficial Association upon their success in securing the passage of the bill known as the marine engineers' bill. The measure, with senate amendments and conference amendments, has passed both houses of congress and will without doubt be signed by the president in a few days. As will be seen by a reading of the bill it affects all licensed officers as well as engineers.

Although the REVIEW questioned the advisability of trying to have this bill provide for more than the recognition of engineers as officers of steam vessels, and that they should be citizens of the United States fully naturalized, there is no feature of the bill that can not be endorsed. Criticism of the original bill was prompted simply by a fear that the unimportant features might endanger the passage of a law of any kind on the subject. Now that Mr. Uhler and his associates have accomplished nearly all that they started out to secure in the bill, their efforts should be especially commended. The five-year term of license is retained. The supervising inspector-general is not called upon to review all cases in which licenses are revoked, but an accused engineer or other officer of a steam vessel is given the right to retain counsel. This will secure fair treatment before local inspection boards, and it also gives the accused the same chance to defend himself that he has in any court of justice. The bill is known as H. R. 3,013 and it amends section 4,131 of the revised statutes. Its provisions as it finally passed both houses of congress are as follows:

"Vessels registered pursuant to law, and no others, except such as shall be duly qualified according to law for carrying on the coasting or fishing trade, shall be deemed vessels of the United States, and entitled to the benefits and privileges appertaining to such vessels; but no such vessel shall enjoy such benefits and privileges longer than it shall continue to be wholly owned by a citizen or citizens of the United States or a corporation created under the laws of any of the States thereof, and be commanded by a citizen of the United States. And all the officers of vessels of the United States who shall have charge of a watch, including pilots, shall in all cases be citizens of the United States. The word 'officers' shall include the chief engineer and each assistant engineer in charge of a watch on vessels propelled wholly or in part by steam; and after the 1st day of January, 1897, no person shall be qualified to hold a license as a commander or watch officer of a merchant vessel of the United States who is not a native born citizen or whose naturalization as a citizen shall not have been fully completed.

"All licenses issued to such officers shall be for a term of five years, but the holder of a license may have the same renewed for another five years at any time before its expiration; provided, however, that any officer holding a license, and who is engaged in a service which necessitates his continuous absence from the United States, may make application in writing for one renewal and transmit the same to the board of local inspectors with a statement of the applicant verified before a consul, or other officer of the United States authorized to administer an oath, setting forth the reasons for not appearing in person; and upon receiving the same the board of local inspectors that originally issued such license shall renew the same for one additional term of such license, and shall notify the applicant of such renewal. And in all cases where the issue is the suspension or revocation of such licenses, whether before the local boards of inspectors, as provided for in section 4450 of the revised statutes, or before the supervising inspector, as provided for in section 4452 of the revised statutes, the accused shall be allowed to appear by counsel and to testify in his own behalf.

"No master, mate, pilot, or engineer of steam vessels licensed under Title LII of the revised statutes shall be liable to draft in time of war, except for the performance of duties such as required by his license; and while performing such duties in the service of the United States every such master, mate, pilot, or engineer shall be entitled to the highest rate of wages paid in the merchant marine of the United States for similar services; and if killed or wounded while performing such duties under the United States they, or their heirs, or their legal representatives shall be entitled to all the privileges accorded to soldiers and sailors serving in the army and navy under the pension laws of the United States.

"All laws or parts of laws in conflict with this act are hereby repealed. But this shall not be construed to modify or repeal that provision of the act of June 26, 1884, which reads as follows: 'In cases

where on a foreign voyage, or on a voyage from an Atlantic to a Pacific port of the United States, any such vessel is for any reason deprived of the services of an officer below the grade of master, his place, or a vacancy caused by the promotion of another officer to such place, may be supplied by a person not a citizen of the United States until the first return of such vessel to its home port; and such vessel shall not be liable to any penalty or penal tax for such employment of an alien officer.'"

Side-Wheel Steamer City of Buffalo.

Numerous statements have been made during the past week regarding fast runs made by the new paddle steamer City of Buffalo between Cleveland and Buffalo. Until a test of the steamer's speed is made under fair conditions, accompanied by reliable reports, it will probably be best to refrain from any statement of her time between the two ports. It is quite certain, however, that the new boat, under favorable conditions, will have little difficulty in making the run, which is a little less than 180 miles, in nine hours. She is undoubtedly the fastest side-wheel steamer on the lakes and has cost her owners, complete, a trifle less than \$240,000. The steamers Western Metropolis and City of Buffalo, which were operated by the Lake Shore Railway on this same route in the fifties, were costly boats and very fast, but there is little question of the new City of Buffalo improving on the best time ever made by either of them. Mr. Thomas Fitzpatrick, vessel owner of Cleveland, erected the beam engines of the Western Metropolis in 1856 and was chief engineer on her during three seasons. He says that the Western Metropolis was a little faster than her sistership, as the power of the two vessels was the same, while the displacement of the City of Buffalo was a little greater than that of the Metropolis. He is positive that the best time ever made by the Western Metropolis between Cleveland and Buffalo was 9 hours and 5 minutes. Owners of the present City of Buffalo claim to have beaten this time already by nearly half an hour, but it will probably will be well to await verified accounts before making definite statements about the speed of the new boat.

The steamer's reception at Buffalo and Cleveland was one round of crowds and enthusiasm. The mayors of both cities took part in the dedication, and the excursions of business men were so largely attended that in Cleveland, at least, the big vessel was unable to accommodate all of them. The Cleveland excursion was under the direction of the Maritime Board, one of the auxiliary organizations of the Cleveland Chamber of Commerce. Capt. Wm. S. Mack is chairman of this organization. He was assisted in conducting the dedication by President Cowles of the Chamber of Commerce and Messrs. Harvey D. Goulder and B. L. Pennington. The resolutions that were adopted are as follows:

"Although organized but three years ago, for the purpose of operating a line of freight and passenger vessels on Lake Erie, the Cleveland & Buffalo Transit Co., by a careful and progressive management, presents to the people of Cleveland today a steamship that represents in every detail the best practice of modern ship building; an artistic and mechanical triumph; a ship of vast dimensions, and of beauty and speed, combining luxurious richness of interior decoration, the best achievements of naval architecture and the highest skill in marine engineering.

"It is fitting that the members of the Maritime Board and the Cleveland Chamber of Commerce, assembled on this magnificent vessel, should give expression to their appreciation of the enterprise of this company; and it is therefore

"Resolved, That we tender to the owners of the City of Buffalo our hearty congratulations upon the success of their undertaking and the manifold advantages and beauties of this ship; and we feel especially honored today in being permitted to dedicate this masterpiece of the ship builder's skill.

"Resolved, That the thanks of the Maritime Board and of the Cleveland Chamber of Commerce be extended for this excursion and that an engrossed copy of these resolutions be presented to Mr. Thomas F. Newman, general manager of the company."

The India, first of the four big steamers building by Caird & Co., Greenock, Scotland, for the great Peninsular & Oriental Co., was launched recently. These ships are 500 by 54 by 37½ feet. A fifth steamer of the same dimensions for the same company is being built by Harland & Wolff of Belfast. They will each have triple expansion, four-cylinder engines, which are to develop 11,000 horse power. Howden's system of hot draft is used in all of them.

Five Crank Type of Engines.

A firm of English ship builders, Messrs. Wm. Gray & Co. of West Hartlepool, have fitted to a large cargo steamer, that is intended for long voyages in the trade to Australia and New Zealand, a set of five-crank engines. The vessel is named *Inchmona*. It is claimed that the five-crank system is the most suitable for large powers and for long-voyage boats, where economy of fuel is of great importance. The cost of machinery is increased, but the builders are claiming that this will be offset many times over by the saving in fuel. The engines are thus described by Fairplay of London:

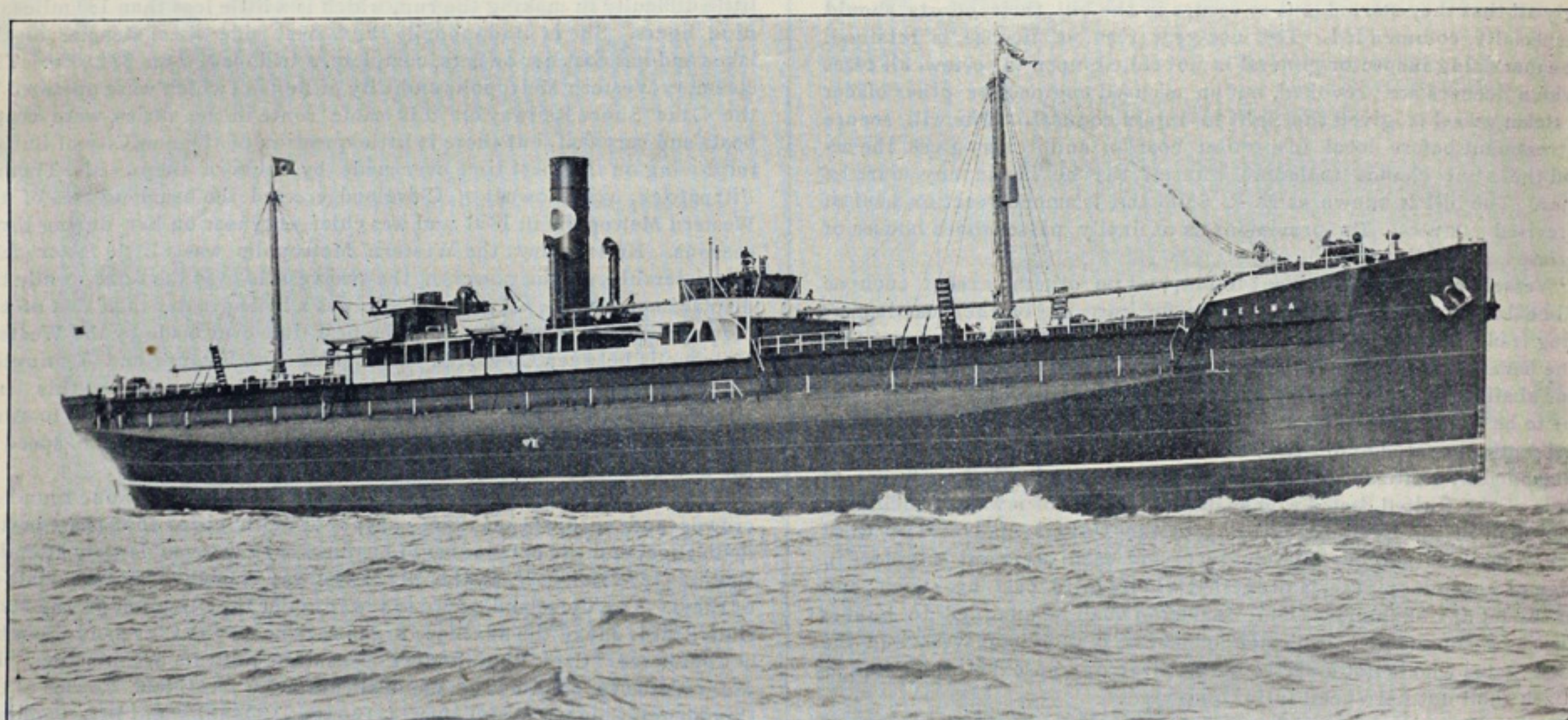
"There are two low-pressure cylinders of equal size, and the engines work on the quadruple principle, each of the five cylinders driving one of the five cranks. The cylinders are all in a straight line on the centre-line of the ship, and all the valves are on the same line, immediately over the crank shaft, and driven by the ordinary link-motion type of valve gear. The five cranks are set at equal angles around the crank circle, so that the propeller receives no less than ten impulses per revolution, besides which a much higher speed of revolution may be freely adopted than is usual with three-crank engines. A three-crank engine at sixty revolutions per minute, having six impulses per revolution, gives 360 impulses per minute; whilst a five-crank engine running eighty revolutions per minute, with ten impulses per revolution, will give the shaft 800 impulses per minute, or more than twice as many as the three-crank

in temperature until on entering the boilers, it is nearly at the temperature of the steam. On the trials of the engines at the sheer-legs the thermometers registered about 400 degrees, Fahr., as the temperature of the feed-water as it passed the meter and entered the boilers. The five-crank system does not involve any great increase in length of engine room space, as the reduced diameters of cylinders allows the centres to be closer. In this ship the engine room is only one frame space longer than for the same power in three-crank engines."

Turret Deck Freight Steamers.

Twenty steamers of the turret deck type shown in the illustration on this page have been built by Wm. Doxford & Sons, Sunderland, England. The English firm began building steamers of this kind shortly after the American Steel Barge Co. was organized in this country, and they have met with unusual success among several firms of ship owners, who are satisfied that the turret deck steamer possesses many advantages over the ordinary freight carrier. All of these steamers are large and of high power, and in two or three of them water tube boilers of Babcock & Wilcox manufacture have been adopted. This English firm also built, some time ago, from designs made by Capt. Alex. McDougall, a whale-back steamer for British owners.

The steamer *Selma*, illustrated herewith, has a deadweight capacity of about 5,600 gross tons. She is owned by Geo. Horsely & Son of Har-



STEAMER SELMA, LATEST OF THE TURRET-DECK TYPE, BUILT BY WM. DOXFORD & SONS, SUNDERLAND, ENG.

engine. At the trials the engines ran so smoothly that at over 100 revolutions per minute there was no vibration of the ship whatever, although she was entirely without cargo. At this speed there are more than sixteen reciprocating impulses delivered per second. The high speed in the reversal of impulses accounts for the absence of vibration in the ship, the huge structure having no time to respond to the tendency that produces vibration. With five cylinders, of which, as in the case of the *Inchmona*, the diameters are 17 inches, 24 inches, 34 inches, 42 inches and 42 inches, the three larger reciprocating weights can without difficulty be made exactly equal, and with a little scheming the weights of the whole five can be made equal. The five-crank principle lends itself to the adoption of very high boiler pressures, which are considered inseparable from a high degree of economy in coal consumption. In the case of the *Inchmona* the working pressure is 255 pounds per square inch, and the boilers, which are of the ordinary cylindrical multitubular type, were tested by Lloyd's to 510 pounds per square inch without any sign of leakage whatever. These boilers are fitted with Mudd's system of superheating apparatus combined with the well known Ellis & Eaves type of induced draught, and with Serve tubes and retarders. An attempt is here made not only to supply the engine with dry steam from the boilers, but to retain it in a dry state throughout the engine; and to this effect there are combined with the superheater an apparatus that Mr. Mudd calls an initial receiver, an exceptionally complete system of steam jacketing to the cylinders, and an exhaust control arrangement. There is also an unusually elaborate scheme of feed-heating. Instead of the usual single vessel, there are a series of feed-heaters worked at graduated temperatures, and as the water passes through these it continues to rise

tlepool, and is the largest vessel of her type yet built. On a measured-mile trial she attained a speed of 10.6 knots. Her builders also turned out, a short time ago, a screw steamer of ordinary design that has a capacity of 11,375 tons. This steamer is named *Algoa*. She is 465 feet long, 58 feet beam and 35 feet depth, and her load draft is 20 feet. Her engines are triple expansion, with cylinders 29, 50 and 80 inches diameter by 51 inches stroke. There are two large single-ended boilers fitted with Ellis & Eaves' induced draft and Serve tubes.

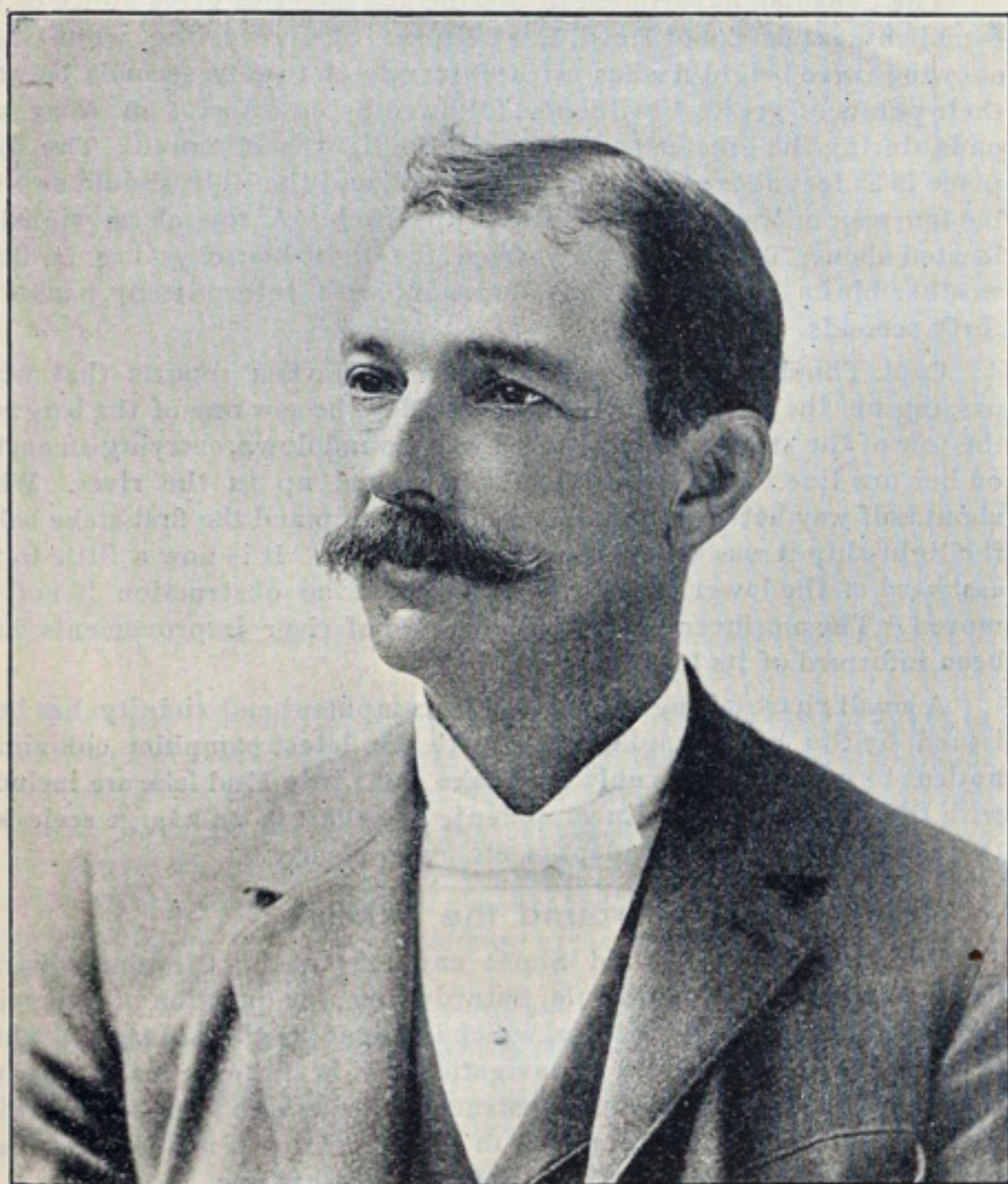
May 1, 1898, is the time fixed for the completion of the subsidized ships that are to run between Canada and England. Now that advertisements calling for bids for the establishment of the line have been issued in England, it would seem that negotiations that have been pending for many months past are really to amount to something. The Canadian government offers a subsidy of \$750,000, and it is expected that the British government will pay \$375,000 a year. The advertisement calls for a speed of 20 knots, which will necessitate the use of vessels capable of a maximum speed of about 21½ knots. They must have a displacement of 8,500 tons each. They must have equipment equal to that of the *Ten-tonic*; accommodations for 275 first-class, 200 second class and 1,000 emigrant passengers, and suitable and sufficient cold storage rooms. In winter the vessel must land in Halifax, to leave the mails, but may then go on to St. John, N. B. In summer they must leave the mails at Quebec, but then may go to Montreal. There are to be four vessels. Offers will be received until June 10. The service is to be weekly and for ten years.

One dollar round trip excursion tickets between Cleveland and Lorain are on sale by agents of the Nickel Plate road. 78 July 31

Captains of the Big Passenger Ships.

When the Northern Steamship Co's big twin-screw steamers North West and North Land open up the passenger business between Buffalo and Duluth, early next month, two captains who have been among the most successful men in charge of lake freight steamers will be in command. Both are young men, as indicated by likenesses that appear on this page, but both have been sailing from boyhood, and they were captains on the lakes before they were, either of them, twenty-one years of age.

Capt. Henry W. Stone, who takes charge of the North Land, is a son of Capt. George Stone of Cleveland, who is one of the pioneers of the lakes, and who is still largely interested in the Bradley fleet, which he helped to build up with the late Alva Bradley. Up to four years ago, Capt. Henry Stone had been constantly in the Bradley employ. His first vessel was the schooner New London, which he sailed before he was of age. Later he was given command of the schooners D. P. Rhodes and Thomas Quayle and then followed a lengthy experience on steamboats, including the Superior, E. B. Hale, Henry Chisholm and Gladstone, all of the Bradley fleet and all still in commission. Capt. Stone left the Bradley employ to take command of the Lake Superior Iron Co's steamer La Salle, which he sailed for four seasons before accepting the inducements



Henry W. Stone, Steamer North Land.

Mr. Brown's Visit to Foreign Ship Yards.

President Wm. L. Brown of the Chicago Ship Building Co., who has just returned from an extended foreign tour, gave special attention to marine interests in the leading European countries. He says he noticed no radical difference between methods of construction followed in foreign countries as compared with our own.

"Ship building is much like any other profession," says Mr. Brown. "If any radical departure is made, the relations are so mutual that every country receives the benefit of it. This was shown by the favorable reception given to me at all the ship yards I visited in England, France, Scotland and Holland. I did not make a deep enough study to express opinions so far as comparisons are concerned. Of course there were some technical points which I took away with me, but they only interest the trade. My investigations were somewhat confined, owing to the difference existing between ship building for lake and salt water trade. But even a casual study of the ship building industry in Great Britain must convince the visitor that England leads in fostering and developing its marine possibilities. Ship yards may be accepted as a criterion to gauge the progress of commerce the world over. Just now the yards on the Clyde are literally congested with work. Principally I noticed the advance made by Great Britain in relation to the newly opened South



G. A. Minar, Steamer North West.

CAPTAINS OF THE TWO STEEL, TWIN-SCREW PASSENGER SHIPS OF THE NORTHERN LINE.

offered him on the North Land. His gentlemanly disposition and his experience on steamboats certainly fit him for the place.

Capt. G. A. Minar has been a master of vessels on the lakes during twenty-three years past. He was only twenty years of age when he took command of the schooner M. I. Wilcox in 1873. During three years following he was captain of the schooner Montpelier, and again in 1877 and 1878 he was in the Wilcox. Later on he sailed the schooners Clayton Belle and Halstead, and then he entered the employ of Capt. James Millen of Detroit where he was for nine years engaged on the steamers Iron Duke, Iron Age and Iron Chief. In 1891 Capt. Millen gave him command of the steamer E. C. Pope, which was at that time a "flyer" and the largest ore carrier on the lakes. From the Pope he went to the Andaste, a Cleveland ore carrier, in 1892, and during the past three years he has been in the W. H. Gilbert, one of the largest of the grain and package freight steamers. His success with these big freight ships caused the Northern line officials to offer him the command of the North West.

A circular just issued by the Joseph Dixon Crucible Co., originators of the graphite industry, notes half a dozen purposes in electric lines in which graphite, or plumbago as it is more commonly known, is now used. Graphite has come to be an important factor in electrical industries, and the Joseph Dixon company is paying particular attention to the requirements of electrical engineers.

African trade, due to the developments in the Transvaal. There was a large order in one of the Scotch yards for the construction of ships to supply this trade. This enterprise fully demonstrates the manner in which Great Britain pushes its commerce. Wherever there is a possibility of growth in the countries under its dominion it is instantly grasped. Not alone do they employ steamship companies to open the trade, but make subsidies if the venture is not self sustaining at the outset. While I must say that England does not outrun us in courage and persistency, the English government is making a study of conditions which we leave to natural circumstances. If England, for example, had dominion over the territory which would permit them to open the pass between North and South America, it would have been done long ago. The fact is that we have been growing so much that we have not devoted any attention to our opportunities for extending our commercial relations. Why should all the freight to this country arrive in foreign bottoms? Why should we not supply our food and natural products to China, the Mediterranean or any foreign port on equal footing with other nations? Our South American trade needs nourishment. If we wish to ship a cargo to any South American province we must send it by way of Great Britain. Much of the machinery used for wood working in foreign shipyards is of American make. It is frankly admitted that our product is superior in this respect."

New Sault Lock to be Opened in July.

As had been expected, the secretary of war has given approval to the plan of paying an extra sum of \$12,000 to the contractors who are digging approaches to the new lock at Sault Ste. Marie, Mich., in order that the lock may be used about July 31 of this year. This action on the part of the war department will greatly facilitate the passage of vessels to and from Lake Superior, although it is hardly expected that the draft of water permitted will be any greater than it is at present, until the 20-foot channel work at the Encampment and at other points on the Sault river is completed about the opening of navigation next spring.

It is quite generally agreed that other Sault river improvements must be taken up in the next congress. First in importance is the widening of Hay lake channel, especially at the dike at the foot of the lake. The channel at this point must be widened or another outlet provided. A Sault correspondent writing of this matter says:

"One of the best authorities on the subject is Joseph Ripley, United States engineer, who has been intimately connected with the river improvements here. Mr. Ripley is heartily in favor of the plan of having a channel through the West Neebish, and allowing the Middle Neebish channel to remain as it is. While the cost of the proposed new channel would be somewhat in excess of the cost of widening the waterway at the Middle Neebish, its advantages over the latter proposition are many. For instance, by having two channels, one could be used for the boats bound up and the other for the boats going down, thus practically wiping out the possibility of accidents. From the foot of Hay lake, around the Encampment to Mud lake, is the most dangerous portion of the river to navigate, more accidents having occurred in that section than at any other point on the river. This is due to the fact that there are so many abrupt turns in the channel. On the other hand, the route through the West Neebish would be comparatively straight and about a mile shorter as well. It is conceded that the proposed route would be of inestimable benefit to the marine interests.

"When the Hay lake channel was first projected, estimates were prepared for the cost of the Middle and West Neebish outlets for a 17-foot channel. The first route was selected, for the reason that the estimated cost was \$1,000,000 less than the other. Subsequently the plans were changed and a 21-foot channel was made. In accomplishing this a number of shoals had to be removed. These would not have been touched had the original plans for a 17-foot cut been carried out. The cost of the work actually exceeded that of the estimated cut of 21 feet by way of the West Neebish. In widening the present channel the same disadvantage will be encountered, consequently the cost of the proposed new cut through the West Neebish will be little more. A voluminous report on the proposed route, covering the cost of the work and the advantages of the scheme over the widening of the present channel, has been prepared by Engineer Ripley with great care. This report will probably be submitted to the chief of army engineers and an effort made to secure, in the next congress, appropriations for beginning the work."

Engines for Light-Draft, High-Speed Ship.

Twin-screw engines of a special and somewhat novel design are described in a late issue of *Engineering*, London. They were fitted by a Dundee firm to the steamer *Puri*, a vessel 260 feet long, designed to carry a large cargo on a light draft and at a high rate of speed, nearly 17 knots. The machinery consists of twin sets of triple expansion engines, each having cylinders 21 inches, 33 inches, and 52 inches in diameter, respectively, by 30 inches stroke, supplied with steam by two large double-ended boilers, fitted with forced draught on the closed stokehold system, and having about 8,000 square feet of heating surface, with an allowance of 160 pounds steam pressure. While the two sets of engines are entirely independent and complete, the two bedplates and the six cylinders are all combined together, forming one structure, with a row of columns placed in the center, between the port and starboard engines, and directly over the center keelson. This dispenses with columns in front of the engines, although there are the usual A frames at the back. The engines are 10 feet 3 inches apart from center to center. The principal advantage of this arrangement is that the weight and strains are spread over a much larger and more efficient surface of the ship's bottom than is usually the case where the twin engines are entirely independent, with separate columns. Vibration, too, is minimised, as was proved on trials when the engines were running at 177 revolutions per minute, and indicating over 4,000 horse power. Another feature is that all the working parts face the center line of the vessel. The engineer in charge can thus see and deal with every working part from the starting platform. The high pressure cylinders are in the center between the intermediate and low pressures. This plan is adopted with a view to reducing to a minimum the exposed walls of the cylinders containing the hottest steam. Thus the piston valve of the high pressure cylinder and the slide valve of the intermediate cylinder are close together in one casing. All the working parts of the engine and the whole of the shafting are of Siemens-Martin steel. The crankpins are hollow, and fitted

with centrifugal lubrication. One bar serves both for go-ahead and go-astern motion. All the handles for operating the machinery, the telegraphs, pressure gauges, drains, etc., are concentrated on the center column between the engines and are easily controlled for both engines by one man. As has been stated, the engines are 10 feet 3 inches apart between centers; propellers are 11 feet 9 inches apart between centers. Each propeller is 10 feet in diameter by 13 feet pitch, and there are three manganese bronze blades to each, and these are bolted to steel bosses. They work outwards.

Notices of Lights, Obstructions, etc.

Capt. Geo. P. McKay, treasurer of the Lake Carriers' Association, is informed by Commander Folger, U. S. N., who is in charge of light-house matters in the rivers above Detroit, that the lighting of Grosse point cut is practically completed, so that with the close of the present week vessels can pass through the new 20-foot channel at that point with no more difficulty than they will have late this fall or next spring, when the permanent lights to be established by the light-house service are established. By the Lake Carriers' Association securing the assistance of the light-house board in establishing and maintaining lights at this point, in advance of the permanent light structures being erected, a heavy expense for private lights is avoided.

The Canadian department of marine and fisheries gives notice of the establishment on Cabot Head, Lake Huron, of a revolving white light, showing three bright flashes with intervals of twenty seconds between their points of greatest brilliancy, followed by an interval of forty seconds, during the greater part of which the light is obscured. The focal plane is 80 feet above the mean water level, and the light should be visible fourteen miles from all points of approach. A fog alarm signal is located about 200 feet easterly from the light-house giving in thick weather blasts of eight seconds duration, with intermittent pauses of forty seconds.

Capt. Thomas Harbottle of the steamer *Havana* reports that while passing up the Detroit river, a few days ago, he saw one of the barges of the tow of the steamer *Buell*, which was bound down, carrying an anchor on her tow line. The anchor had been picked up in the river. When about half way between Ballard's reef light-ship and the first stake below the light-ship it was dropped from the tow line. It is now a little to the eastward of the lower range and may prove an obstruction if not removed. The engineer officers in charge of river improvements have been informed of its location.

A small chart taking in Sailors' Encampment and vicinity has been issued by the hydrographic office with the latest pamphlet containing notices to mariners. As only Mud lake and Little Mud lake are included with the channel at the Encampment, the chart is on a large scale and therefore gives all ranges, depths, etc., very clearly.

Around the Lakes.

Col. Jared Smith, United States engineer in the Cleveland district, heard arguments at Ashtabula, Saturday, on the question of removing the bridge at Ashtabula Harbor, which is owned by the county and which is said to be an obstruction to navigation. It is quite probable that the county will be compelled to reconstruct the bridge, so as to have it swing from the side of the river opposite to that on which it is now located and so as to provide also a wider draw than the present one.

A. A. Heard, general passenger agent of the Northern Steamship Co. has issued its annual itinerary for the season of 1896. The work is neatly compiled, and contains a good deal of information which will be interesting to all tourists. It is handsomely illustrated with views of sights along the route of the steamers, and also of the Great Northern Railway. A copy will be sent to anyone upon application to A. A. Heard.

The Thompson Towing & Wrecking Co. is the incorporate name under which the Thompson tugs at Port Huron will be managed hereafter. The capital stock of the new company is \$100,000, and C. D. Thompson and C. L. Boynton are the principal stockholders. They have recently added a new tug to the line, and are preparing plans for the construction of a new wrecking tug.

Five round trips between Cleveland and Marquette with ore in just thirty days is the record, thus far this season, of the Cleveland Rolling Mill Co's steamer *J. H. Devereaux*, which is managed by Capt. W. C. Richardson. The *Devereaux* left Cleveland Tuesday on her sixth trip.

W. A. Gordon, who was serving as mate of the schooner *Emma C. Hutchinson*, and who was drowned from that vessel while she was crossing Lake Erie a few days ago, was last season in command of the schooner *C. C. Barnes*. His home was in Toledo.

During the week ending at midnight Thursday, the 14th, 581 boats were locked through the United States canal at Sault Ste. Marie. This is a daily average of eighty-three vessels.

Algeria is the name of the third big wooden schooner to be launched from Davidson's yard, West Bay City, this spring.

Capt. Bernard Wilds.

Capt. Bernard Wilds of Detroit, who died suddenly on board his boat, the steamer St. Paul, while crossing Lake Erie on Sunday last, had followed the lakes since he was twelve years of age. His death was due to a stroke of apoplexy, received while his boat was at Conneaut unloading.



Capt. Wilds was born in Lancaster, O., Aug. 16, 1834, and was therefore in his sixty-second year. He was the owner of considerable vessel property in time past, and had accumulated quite a large amount of Detroit real estate and other property, probably worth \$75,000. After partly concluding to give up the vessel business about three years ago, he again turned to sailing when he bought the St. Paul at marshal sale and was endeavoring to get a return for money expended on her. He leaves a wife and three married children.

Bills Aimed Against Canadians on Lake Vessels.

Members of congress who are in favor of changing the immigration laws had a hearing in the house Wednesday, and there was considerable talk of restrictions in the matter of employing Canadians on lake vessels. A measure embodying some of the features of the bill introduced some time ago by Representative Corliss of Detroit was passed, but it is hardly probable that any law regarding immigration will go through both houses. Nearly all of the immigration bills contain clauses prohibiting the employment of Canadians on American lake vessels, but nothing of this kind has as yet been endorsed by committee in either house. One measure that has been reported favorable is that of Representative Mahany of New York, known as H R 8,474. But before his bill was reported from committee, Mr. Mahany was made acquainted with conditions on the lakes and the bill was so changed that it will not if it becomes a law interfere with the custom that now prevails in hiring men for lake ships. In its original form the section of the Mahany bill that referred to the employment of Canadians on lake vessels was as follows:

"That sailors and deck hands working on American vessels plying on the great lakes shall be permanently domiciled in the United States six months immediately prior to their working or engagement on said American vessels. The masters or owners of said vessels shall be, and are hereby, held responsible for knowingly employing all hands to man and work on said American vessel or vessels, and any master or owner permitting the working on such vessels of any alien who had not been permanently domiciled in the United States six months immediately prior to such working or employment shall be deemed guilty of a misdemeanor, and shall, on conviction, be find the sum of not more than \$500 nor less than \$300 or by a term of imprisonment not exceeding one year and not less than six months for every such offense."

As amended in committee and reported to the house, this clause was changed to read as follows: "That it shall be unlawful for any person,

partnership, company, or corporation, knowingly to employ in any manner whatsoever in the United States any alien who resides or retains his home in a foreign country; provided, that the provisions of this act shall not apply to the employment of sailors, deck hands, or other employees of vessels navigating the great lakes, or the rivers tributary thereto."

Ship Yard Matters.

A Detroit correspondent says: "Steamer No. 123, which I am informed is to be named Aragon, will, in all probability be launched Saturday, the 23d. This is the steel lumber carrier building for C. R. Jones and others of Cleveland. The finishing of iron work on this steamer has been delayed, owing to lateness of delivery on certain material for upper works, which is now on hand and is being rapidly placed. Some changes are being made in officers' quarters forward. Bulkheads are being moved farther aft, giving more berth room, etc. Joiners are now at work on the cabins. Engines for the Aragon have been in readiness for some time past at the Dry Dock Engine Works and Supt. Calder intends placing them on board as now erected. This is quite a departure from the usual custom and will effect quite a saving in time and cost. The steamer North Star, which collided with the car ferry dock, punching a hole in each bow, has been patched up temporarily at Oades' marine railway. The steam yacht Pastime has been out during the past week for hull repairs. She was also given a new wheel by the Frontier Iron Works."

Tonnage and official numbers of lake vessels registered in the office of the United States commissioner of navigation during the week ending May 9 are as follows: Steam—Vigilant, Buffalo, 372.09 tons gross and 253.03 net, No. 161,767; R. P. Easton, Grand Haven, 19.29 tons gross, 13.12 net, No. 111,112. Sail—Algeria, Port Huron, 2,038.66 tons gross, 1,917.68 net, No. 107,222; Vinland, Port Huron, 965.12 tons gross, 873.02 net, No. 161,768; Mary E. Dykes, Grand Haven, 44.16 tons gross, 44.16 net, No. 92,704; Fox, 9.61 tons gross, 9.61 net, No. 121,021. Unrigged—Carbonate, Buffalo, 94.07 tons gross, 94.07 net, No. 34,247; Eleanora, Buffalo, 225.70 tons gross, 225.70 net, No. 36,865.

The big steel harbor tug Edna G., built by the Cleveland Ship Building Co. for the Duluth & Iron Range Ry. Co., for service at Two Harbors, is on her way to Lake Superior in charge of Capt. Cox. This tug is expected to make 15 miles an hour, and she will probably do so, as she has Babcock & Wilcox water tube boilers and very high power. Her cabins are fitted up like those of a big steam yacht, and it is probable that during the summer season the wealthy stockholders of the big Minnesota company will find her very servicable for fishing and hunting excursions.

Since the spring rush of dry dock work at the Ship Owners' plant, Cleveland, has been over with, that company has pushed operations on the wooden tug, which they are building for harbor service at Huron, O. The tug is 82 by 19 by 10 feet. High pressure engines will be furnished by Clough & Witt of Cleveland and the boiler by the River Machine Works.

Samuel F. Hodge & Co. fitted a wheel, last week, to the steamer Unique, which it is claimed has improved her time somewhat. Some trials between up-river ports showed an improvement which will not come amiss when all the flyers, which are looking for her scalp, get after her, although it seems to be the general impression that the little propeller is well able to care for herself.

David Bell of Buffalo has launched the 75-foot steel passenger vessel, which he is building for Geo. Moon and others of Buffalo, and will soon launch a smaller boat, which he is building on his own account.

Repairs to the wooden steamer J. W. Morley, which struck a rock in the St. Lawrence river, and which is in the Cleveland dry dock, will amount to about \$5,000.

Mr. F. P. Gordon, lake representative of Johnson & Higgins, New York brokers, who place, with foreign underwriters, the great bulk of risks on steel vessels of the lakes, was in Cleveland, Thursday. It is understood that the proportion of insurance secured by Johnson & Higgins this year has been even larger than in past seasons, on account of no change being made in the foreign policy. The lake underwriters probably made a mistake in not only asking higher rates of insurance, but also including in their policy several restrictions that were very unsatisfactory. It is understood that Johnson & Higgins will get all insurance on the big Rockefeller fleet.

The American Shipbuilder of May 14 contains a portrait and sketch of John A. Courier, marine engineer of Boston, who has for a number of years past been in charge of the machinery of steam yachts owned by John M. Forbes, and who has been interested with Mr. Forbes in directing attention in this country to merits of the Belleville water tube boilers. Mr. Courier is a very capable marine engineer.

For description of steamer Coralia which appears as a supplement to this issue, see the REVIEW of April 30. She is practically a duplicate of the Sir Henry Bessemer.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, O by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.13
Sailing vessels.....	1,100	300,642.10
Unrigged.....	487	83,081.91
Total.....	3,342	1,241,459.14

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Gross Tonnage.
1891.....	204	111,856.45
" " " 1892.....	169	45,958.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
Total.....	747	335,433.98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895.*	1894.	1893.	1895.	1894.	1893.
No. vessel pass'ges	17,956	14,491	12,008	3,434	3,352	3,341
T'n'ge, net registd	16,806,781	13,110,366	9,849,754	8,448,246	8,039,175	7,659,068
Days of Navigat'n	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about 1/4 per cent. of the whole, but largely in American vessels.

THE PASSAGE of the marine engineers' bill in congress during the past week is a matter of more than ordinary interest to the vessel owners of the lakes, as well as the very large number of engineers who are employed on lake steamers. The bill, which appears in full in another part of this issue, meets with approval from every fair-minded vessel owner, who realizes the importance of an engineer's position aboard a steam vessel. Although the engineers met with some opposition from owners of sea-going ships when the measure was first introduced in congress, it can be said authoritatively that at no time since this legislation was proposed has there been any objection to it from lake vessel owners, either through the Lake Carriers' Association or otherwise. But there is one conclusion, important to both engineers and vessel owners, to be drawn from the passage of the bill. It certainly directs attention to George Uhler as a shrewd and conservative leader of the marine engineers of this country. Mr. Uhler has proven an able chief in the organization that he represents and a continuance of his present course will rank him with Chief Arthur of the Brotherhood of Locomotive engineers, whose business-like, straight-forward methods have distinguished him as the only successful leader of a labor organization at the present time. This reference to Mr. Uhler is not intended as any bid for favor from him. The REVIEW has differed with him in certain matters pertaining to the passage of the measure here referred to, and may find occasion to oppose very earnestly his course in the future, but it is due him to say that he has shown more ability, since his election to the presidency of the organization of marine engineers, than any man who has ever been connected with associations of this kind. The passage of this bill will strengthen the engineers in their organization and will cause them to rally to the support of Mr. Uhler as a leader with confidence and enthusiasm. Congress has everything to do with shipping but little to do with railways or other corporations that employ large bodies of skilled men like the engineers. On this account the influence of such a leader as Mr. Uhler in Washington may be made very great. He is against strikes, but thoroughly in favor of a system of education among the engineers regarding their profession and the laws governing the operation of ships. If he remains with the asso-

ciation, of which he has twice been elected president, he will certainly be heard of in connection with further legislation along the line suggested by the bill that has just passed congress.

IN THREE or four issues of the REVIEW during March and April of this year there was printed a series of articles in support of the claim that there must be a readjustment in some way of the relations of the engineer to our modern navy. These articles had special reference to a bill with this end in view, which has been under consideration in the present congress, but which has failed of passage, largely on account of the line and staff controversy which is proving very disastrous in the navy. But it is evident that the naval engineers are not giving up their fight on account of the difficulties which they met with in trying to secure this legislation. In an article in the North American Review for May, Chief Engineer Melville takes up the subject with his usual vigor and earnestness. He says: "The artificers, engine drivers, warrant machinists, call them what you please, will have a light burden in battle compared with the trained engineer. This officer will have to supervise all the machinery below the water line. When the ship is cleared for action he must inspire that isolated band of firemen and mechanics hermetically sealed below the protective deck. Looking, therefore, to the engineer for instruction, for direction, for advice in emergency, and for support in danger, will be that body of unappreciated men who constitute his force. It is imperative that they (the engineers) receive military training, but the safety of our fleets demands that all should obtain more engineering instruction than is now given at the naval academy, where the cadets assigned to the engineer corps are given but one year in marine engineering. The co-operation of the many scientific colleges and schools should be secured without delay. The institution at Annapolis must be brought into competition with the scientific colleges. This policy would be of advantage to the cadets, to the competing institutions and to the navy. Annapolis is either unable or unwilling to train naval engineers, and if its work is brought into comparison with that of other institutions, the naval academy will be compelled to extend its engineering curriculum or show cause for its existence." This argument on behalf of the engineering force is supported by a series of short papers by W. S. Aldrich, professor of mechanical engineering in the University of West Virginia; Ira N. Hollis, professor of engineering in Harvard University; Gardiner C. Sims, of the American Society of Mechanical Engineers, and George Uhler, president of the Marine Engineers' Beneficial Association.

IN THE effort to obtain a clear spar deck, so as to facilitate loading and unloading, some of the big ore carriers that are now being built have no deck house of any kind aft, and in nearly all of them the houses, both forward and aft, are crowded into small space at the extremes of the ship. In the ship, with no deck houses aft, dining rooms and living quarters common to this part of lake vessels are below deck, and it has been necessary to put in blowers, in order that a current of air may be provided. It would seem that these changes in favor of dispatch in port and against the comfort of crews may be carried to extremes. Although owners may not have heard it as yet, there is a growing feeling of opposition to this practice, not only from such of the crews as are compelled to live in the after part of ships, but also from deck officers, who do not relish the idea of standing long watches in fall gales around pilot houses perched far up in the bow, especially when they are expected to make time by running in all sorts of weather. As a rule, vessel owners on the lakes have had great regard in the past for the comfort of their crews, and it is to be hoped that in this effort to obtain clear upper decks they will not lose sight of the duty which they owe the men in their employ. This is a matter that is subject to legislation, and it would be better to look to it in time than to incur a controversy that may result in stringent regulations.

PREVIOUS to the collision between the steamers L. C. Waldo and Choctaw, Wednesday, lake underwriters were, very probably, congratulating themselves upon having escaped, thus far this spring, any big losses on steel ships. Their experience last season must certainly make them fear losses of this kind. In a few cases the repair bills that they were called upon to pay were very heavy. Take, for instance, the steamer Alva of the Bradley fleet. She was in dock for repairs last season three times and her bills footed up \$40,000, against a premium of a little less than \$4,000. And the underwriters are not through with her yet. Her insurance does not expire until August.

A SINGLE word omitted from a short article in the last issue of the REVIEW may have conveyed the impression to some of our readers that there was little possibility of the river and harbor bill becoming a law. Such is, of course, not the case. The bill has passed both houses and is now in conference. A report may be made by the conference committee any day now, and there is every assurance that the bill will become a law with few changes in the senate amendments.

Hydraulic Press vs. Steam Hammer.

"Making Steel Forgings in America" is the title of an article by Mr. H. F. J. Porter that will appear in Cassier's Magazine for June. Mr. Porter is the western agent of the Bethlehem Iron Co. His headquarters are in Chicago. Of the difference between the use of the hydraulic press and the steam hammer, he says:

"The pressure applied in shaping a body of steel should be sufficient in amount and of such character as to penetrate to the centre and cause flowing throughout the mass. As this flowing of the metal requires a certain amount of time, the requisite pressure should be maintained throughout a corresponding period. The hydraulic press, therefore, is used instead of the hammer to work it into shape. Under its action the forging is slowly operated upon, and the pressure distributes itself evenly throughout the mass, whereas under the high velocity of impact of the hammer the metal has not time to flow, and internal strains, if not always defects, are thereby created. In fact, the cause of failure of many forgings, particularly large ones, can often be attributed to their having been shaped under a hammer of insufficient power where the blow is developed by a high velocity, rather than by weight of falling mass. The difference in the effect of these two methods of forging is apparent in large cylindrical shafts. Those forged under a hammer have concave ends, showing that the blow has not penetrated the forging, but has worked only upon the surface and drawn it out, leaving the central portion behind, and thus producing a tearing strain on the core by which actual cavities may be developed. The reverse is the case with a shaft that has been hydraulic forged. Its ends are either straight or slightly convex. The pressure being definite and constant, and acting slowly but uniformly throughout the distance traversed by each stroke, passes completely through the forging and tends to force out the centre, that portion being hottest and, therefore, the softest. In order to insure the most thorough working of the metal, large shafts and similar forgings should be made hollow, where practicable. The production of such forgings is much facilitated by the use of the hydraulic press. The thin walls of the hollow ingot are readily reheated, and the danger of internal cracking during that operation is removed. After reheating a mandril is passed through the ingot and it is then worked down under the press, the diameter gradually decreasing and the length increasing proportionally. It is much more difficult to hollow forge with a hammer than with a press, especially in long lengths. A slow and even pressure is necessary to draw out the thin cylindrical walls equally and make a shaft which is straight and symmetrical throughout. During this change in shape the metal must, of course, be reheated frequently. Operating on metal that has become too cold to flow would only bruise and tear it."

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes on May 16, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago.....	15,225,000	4,137,000
Duluth.....	8,574,000
Milwaukee.....	667,000	2,000
Detroit.....	197,000	21,000
Toledo.....	490,000	78,000
Buffalo.....	1,547,000	477,000
Total.....	26,700,000	4,715,000

As compared with a week ago, the above figures show at the several points named a decrease of 1,128,000 bushels of wheat and 1,049,000 bushels of corn.

Notwithstanding the report of the commission of engineers, the house committee on interstate and foreign commerce has reported favorably upon the Nicaragua canal bill. The measure has, however, been greatly changed, and it is the opinion of everybody interested in the canal that the promoters made a mistake in antagonizing the commission. The bill as changed in committee permits the issuance of \$100,000,000 3 per cent. bonds, interest and principal to be guaranteed by the government. It requires that all the outstanding stock of the Maritime company, except that issued to Nicaragua and Costa Rica, shall be called in and canceled. The government is to be secured against loss by the issuance of \$100,000,000 of stock, which will be deposited with the secretary of the treasury. Of this issue an amount not exceeding in value \$4,500,000 may be paid to the company to reimburse it for the moneys already expended. The canal is to be constructed under the supervision of the war department. The board of directors shall consist of eleven persons, one to be appointed by Costa Rica, one by Nicaragua, one by the company, and the remaining eight by the president of the United States. Provision is also made for the gradual extinguishment of the bonds out of the net earnings of the canal, after interest on the outstanding indebtedness shall have been paid.

Trade Notes.

The Boston & Montana Consolidated Copper & Silver Mining Co. of Great Falls, Mont., is erecting a new electrical power house in connection with its large mining plant. The Berlin Iron Bridge Co. of East Berlin, Conn., will furnish the steel work.

The Continential Iron Works, Brooklyn, N. Y., has lately supplied three Morison suspension furnaces to the International Navigation Co. of New York for the steamer Illinois, and several to the Plant Steamship Co. for use on their steamers; also four to the Tuttle Mfg. Co. of Annaconda, Mont., and six to Wm. B. Pollock & Co. of Youngstown, O.

The Buffalo Forge Co., Buffalo, N. Y., is building up quite a trade in blowers on naval vessels. They obtained an order recently from Moran Bros. & Co. of Seattle, Wash., for four blowers with compound engines required on the United States torpedo boat No. 8, which they are building. The Buffalo company also has orders for blowers and engines for torpedo boats 3, 4 and 5, as well as the Holland torpedo boat building at the Columbian Iron Works and the big revenue cutter building at the Atlantic works, East Boston.

For some time past officers of the Penberthy Injector Co., Detroit, have been looking forward to the rounding out of their first 100,000 injectors. They had anticipated reaching that number about July, but the demand for their goods has been so heavy that they turned out a larger number than anticipated, and have just reached the number 100,000, which was placed on a half-inch injector on May 12. In honor of this event the company will give its employees a holiday and excursion a little later in the summer, probably during the latter part of June.

In Germany, as well as in England and this country, the demand for the Morison suspension furnace has practically excluded entirely the original Fox section, of which the Morrison is a development. It is understood that the Continental Iron Works, manufacturers of these furnaces in the United States, have practically ceased to make the Fox furnace. A report in one of the English ship building journals is to the effect that of 600 furnaces ordered through one firm on the continent during the first three months of this year, 80 per cent. were of the Morison type.

The B. F. Sturtevant Co. of Boston, always up to date with handsome and attractive printed matter, has just issued two elegant catalogues, one describing Sturtevant forges and the other a new general treatise on heating and ventilation. The latter, which is profusely illustrated, is probably the most complete catalogue of its kind ever gotten out. It is an enlargement and improvement on a similar work published eight years ago. A general discussion of ventilating and heating methods is followed by an explanation of the Sturtevant system, and by illustrations and details of the various kinds of Sturtevant devices. Views of manufacturing plants, public building, etc., in which the system is employed form an important part of the catalogue.

Among freight steamers recently equipped with electric lighting outfits by the Fisher Electrical Mfg. Co. of Detroit are the steamer Coralia, largest carrier on the lakes, and the steamers Chili and Geo. Orr. The Coralia's outfit consists of two direct connected engines and dynamos of 150 lights capacity each. All the lights below the main deck are enclosed in water-proof vapor globes, the Coralia being the first boat on the lakes to use this type of fixture. She has four arc lamps in addition to the incandescents, a six-circuit switchboard, automatic signal lamps and other improved electrical appliances. The Chili and Orr are also supplied with direct connected generating sets, two each, of 150 lights capacity each. This company has also equipped the Lake Michigan passenger steamers Eugene C. Hart and Fanny C. Hart, and they are now supplying F. W. Wheeler & Co. of West Bay City with four direct connected, 150-light generating sets for Rockefeller ships. Two are for the steamer Geo. Stephenson and one each for the steel schooners James Nasmyth and Sir Isaac Lothian Bell. On the yacht Enquirer, building at Buffalo for W. J. Connors, they will install two generating sets similar to those just referred to, as well as a Mangin search lamp. There will be 400 incandescent lamps distributed throughout the yacht and rigging. The package freight steamer building at the works of the Union Dry Dock Co., Buffalo, is also to be equipped with the Fisher company's standard direct connected plant. She will have lights enclosed in vapor globes.

Here is a splendid opportunity of visiting the west. The Nickel Plate road has authorized low excursion rates to Ottawa, Kansas, on May 17, 21 and 22 for the annual convention of the Dunkards, which convenes at Ottawa on May 26. Tickets may be extended thirty days from date of issue by depositing them with the joint agent at Ottawa. The uniform courtesy of employes, the best of roadbeds, and the splendid modern equipment of this line has made it the popular low rate line for all points west.

74-May 21

Low rate, short limit tickets between Cleveland and Lorain have been placed on sale via the Nickel Plate road at \$1.00 for the round trip. 77-7-31

St. Mary's Falls Canal, Michigan.

THE LAW—EXTRACT FROM ACT OF CONGRESS, AUG. 17, 1894.

SEC. 4. That it shall be the duty of the secretary of war to prescribe such rules and regulations for the use, administration, and navigation of any or all canals and similar works of navigation that now are, or that hereafter may be, owned, operated or maintained by the United States as in his judgment the public necessity may require.

Such rules and regulations shall be posted in conspicuous and appropriate places, for the information of the public; and every person and every corporation which shall knowingly and wilfully violate such rules and regulations shall be deemed guilty of a misdemeanor and, on conviction thereof in any district court in the United States within whose territorial jurisdiction such offense may have been committed, shall be punished by a fine not exceeding five hundred dollars, or by imprisonment (in the case of a natural person) not exceeding six months, in the discretion of the court.

RULES AND REGULATIONS.—ADMINISTRATION.

1. The canal and all its appurtenances shall be in charge of the officer of the corps of engineers, United States army, detailed for that duty by the secretary of war. His representative at the locality shall be the assistant engineer in local charge of the works of river and harbor improvement, who, for canal purposes, shall be styled general superintendent. Except in case of emergency, all orders and instructions from the engineer officer in charge, shall be communicated to the canal force through the general superintendent. In case of emergency, however, he is authorized to take such steps as may be immediately necessary without waiting for instructions from the engineer officer in charge.

2. The canal force shall consist of one superintendent, one clerk, three assistant superintendents, and such enginemen, watchmen, foremen, lockmen and laborers as may be necessary to the efficient operation of the canal and care of grounds and other public property pertaining to the canal.

3. The superintendent shall be charged with the immediate control and management of the entire force. He shall see that all the members perform their respective duties, and that all rules and regulations for use of the canal and grounds are duly enforced, to which end he is authorized to give all necessary orders and directions in accordance with said rules and regulations, both to employees of the government and to any or every person within the limits of the canal or the grounds pertaining thereto, whether navigating the canal or not. In case of his absence or disability his duties shall be performed on their respective watches by the assistant superintendents.

4. The clerk shall keep the books and records pertaining to the canal and grounds. He shall see to the collection of all required statistical information relating to the business of the canal. He shall prepare all vouchers and accounts and perform all other duties that may arise of a similar character.

5. The remainder of the canal force shall be divided into three watches, each consisting of one assistant superintendent and the necessary enginemen, watchmen, foremen, lockmen and laborers. The duration of each watch shall be eight hours, and the watches shall be kept in rotation, but in case of emergency, the superintendent may vary the duration of the watches, the ordinary routine to be resumed as soon as the emergency has passed.

6. Under the personal direction of its assistant superintendent, the individual members of each watch during its tour of duty will be employed in passing vessels through the canal, in the care and protection of the canal and grounds, as well as of all other property belonging to the United States. They are enjoined to be diligent and attentive in the performance of their duties, courteous but firm to all with whom they come in contact, and to never lose sight of the fact that the purpose of their employment is to facilitate the use of the canal.

USE AND NAVIGATION OF THE CANAL.

7. The canal grounds when used in these rules will mean all of these grounds which have been set aside for the use of the canal or occupied in its construction and including the area covered by its riparian rights. Therefore, the western limit is the end of the pier on which the lighthouse stands and the eastern limit is the northeastern corner of Old Fort Brady reservation. The canal is the water lying between these two points and the bed and banks containing the same.

8. The movement of all vessels, boats or other floating things, in the canal shall be under the direction of the superintendent and his assistants, whose orders and instructions must be obeyed.

9. All steamers desiring to use the locks shall signal for the same by two long and two short blasts of the whistle.

10. No tow shall enter or pass through the canal with a tow line more than 400 feet in length.

11. In passing the canal, vessels or boats belonging to the United States government shall have precedence over all others. All registered merchant vessels must pass through the canal and locks in the order of their arrival at the canal, unless otherwise directed by the superintendent or his assistant in charge. The time of arrival at the canal will be the time

of crossing the straight lines which join the extremes of the piers of the eastern and western ends of the canal, respectively. Unregistered craft will not be locked separately unless specially permitted by the superintendent or by one of the assistant superintendents of the canal.

12. No person in charge of a boat coming from above shall bring it within 400 feet of the upper gates until they are made ready for it to enter, and no person in charge of a boat coming from below shall bring it within 200 feet of the lower gates until they are ready for entrance.

13. Upon each passage through the canal, masters or clerks of vessels or boats shall report to the canal office, upon prescribed forms, a statement of passengers, freight, and registered tonnage, and such other statistical information as may be required by the blank forms which are issued to them for the purpose.

14. No business, trading, or landing of freight or baggage, will be allowed on or over the canal piers or lock walls, nor over the piers or grounds forming a part of the canal or its appurtenances, except such small articles as may be readily carried in the hand. All persons in charge of, or employed on, any ferry boat are prohibited landing such boat at any of the canal piers.

15. No person in charge of, or employed on, any vessel or boat shall moor it to the piers except when specially permitted by the superintendent, and then only in such places and for such times as he may direct.

16. No person shall throw any material of any kind into the canal; nor shall any person clean flues in the locks.

17. All persons, whether in charge of vessels or not, are prohibited from wilfully or carelessly damaging the canal grounds, the canal, or any part thereof.

18. No person shall enter or navigate the canal with a boat which when entering, or while navigating the canal, shall have an iron or irons projecting from it, or rough surface or surfaces on it, which would be liable to damage the lock walls or canal piers.

19. No person shall cause or permit any vessel or boat of which he is in charge, or on which he is employed, to in any way obstruct the canal, or delay in passing through it, unless he is permitted to do so by the superintendent or one of the assistant superintendents of the canal.

20. In case of any vessel, boat, or other craft or raft sinking or grounding in the canal, or otherwise obstructing it, the general superintendent, or, in his absence, the superintendent of the canal, or the assistant superintendent for the time being, acting as superintendent, shall have the right to take such possession of such vessel, boat, or other craft or raft, as shall be necessary for the purpose, and remove it and clear the canal of the obstruction caused by it, and no one shall interfere with or prohibit him from doing so, or do anything that will tend to interfere with or prohibit him from doing so.

21. On the canal being obstructed by a vessel or boat or other craft, or a raft, by sinking, grounding or otherwise, the general superintendent of the canal, the superintendent or one of the assistant superintendents, in the contingency and in the sequence named in the preceding paragraph, may give notice in writing.

The foregoing rules and regulations shall be of force and effect upon the opening of navigation for the season of 1896.

DANIEL S. LAMONT,
Secretary of War

In General.

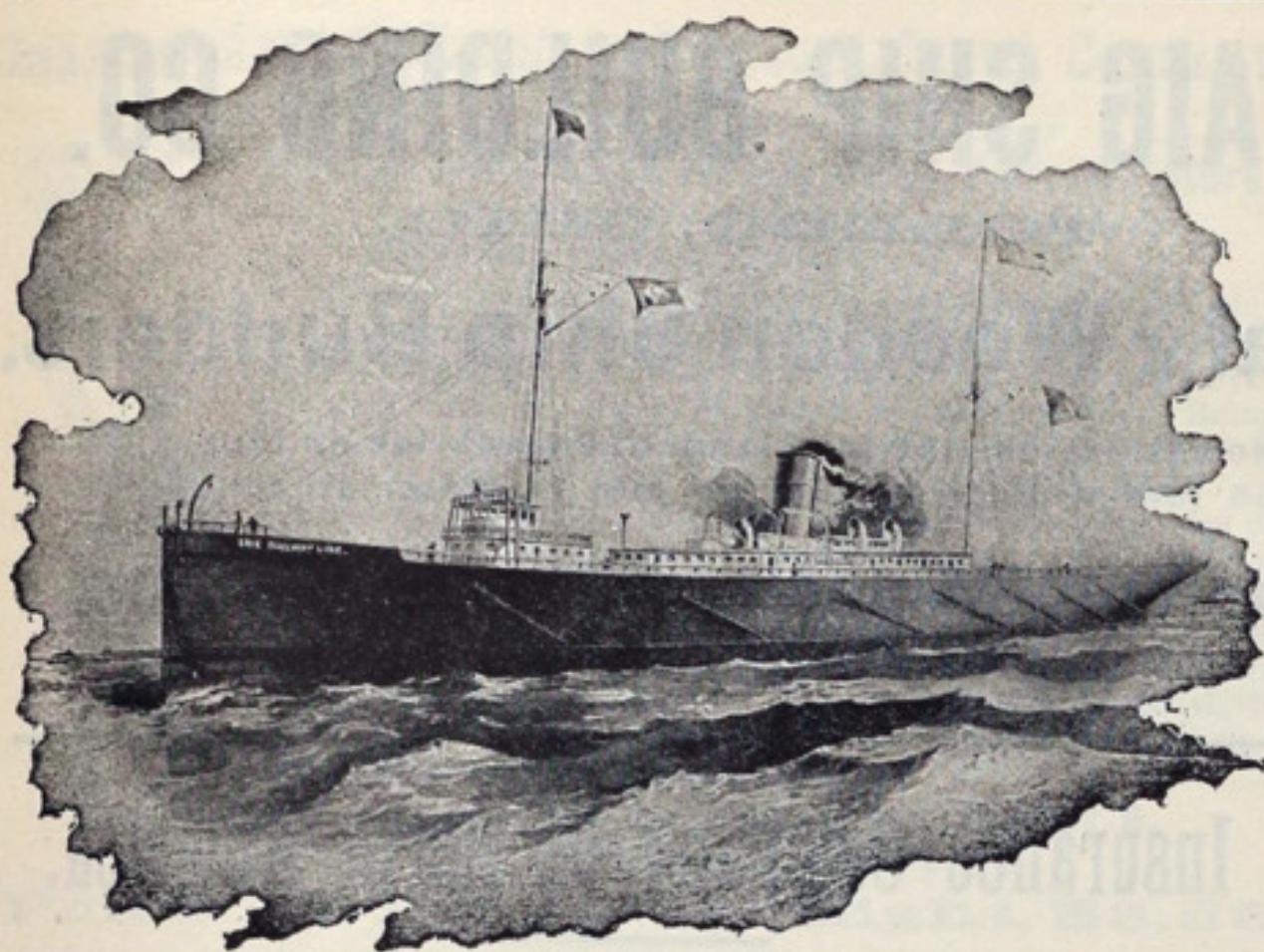
A premium of \$250 is offered by the Scientific American, New York, for the best essay on the "Progress of Invention During the Past Fifty Years."

For the purpose of assisting in the detection of icebergs this spring, the American line has had the steamer St. Paul equipped with a 2,000 candle-power searchlight, which is carried in an iron cage over the ship's bow at the water's edge.

Production of pig iron throughout the country remains practically stationary, at a rate which the accumulation of stocks shows to be excessive. The production on May 1 was at the rate of 188,319 gross tons weekly, as against 187,451 tons on April 1 and 189,583 tons on March 1.

Branches, or harbors as they are called, of the American Association of Masters and Pilots of Steam Vessels are now in operation in five lake ports as follows: No. 33, Chicago; No. 34 Saugatuck, Mich.; No. 41, Buffalo; No. 42, Cleveland, and No. 43, Toledo. Immediately after the close of navigation, Capt. B. F. Perkins, the grand secretary of the organization, will institute harbors in Detroit, Port Huron, West Bay City, Milwaukee and Duluth. Beginning some time next month, the secretary will accompany Capt. W. S. Van Keuren, grand captain of the association on a tour of the Atlantic and gulf harbors.

About 40,000 cubic yards of earth and 9,600 cubic yards of rock dredging at Ashtabula Harbor will be done by the Cleveland Dredging Co. at 12 cents per cubic yard in accordance with bids on the work opened on Saturday last.



Rapid Fueling Docks, DETROIT RIVER.

JAMES GRAHAM, Foot Twenty-first St., Detroit,
Below Routes of Passenger and Car
Ferry Lines.

Pockets and Chutes arranged for different types of vessels.

BEST STEAM COAL.

Large Supplies and every effort to give dispatch, day and night. Wide stretch of river for tows, and plenty of water at dock at all times.

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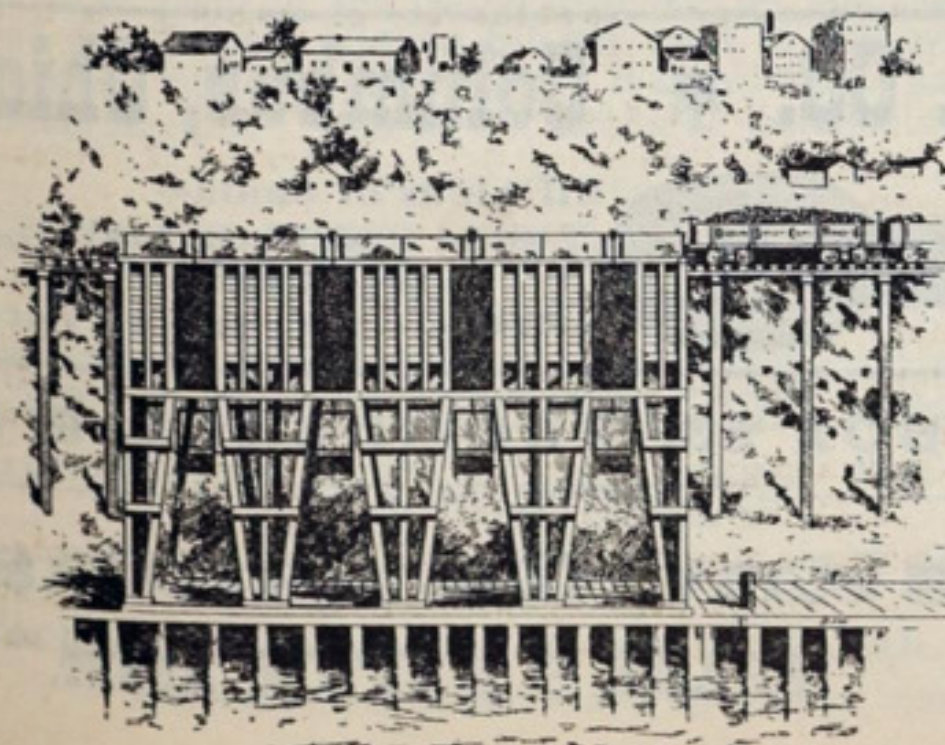
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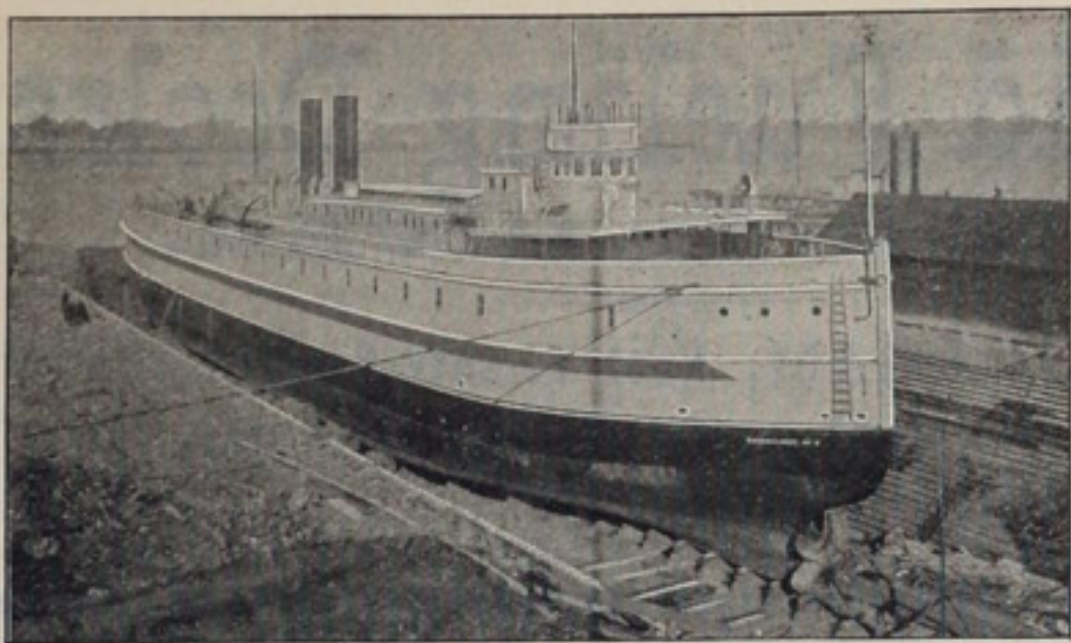
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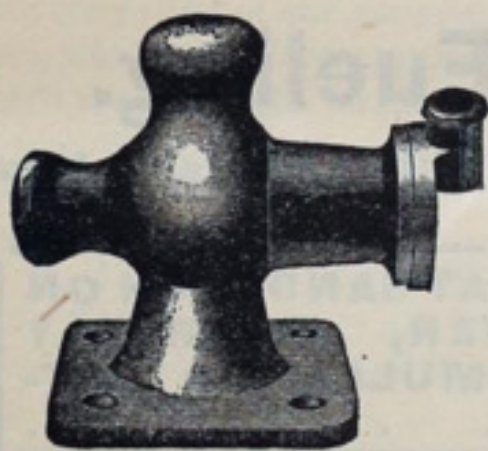


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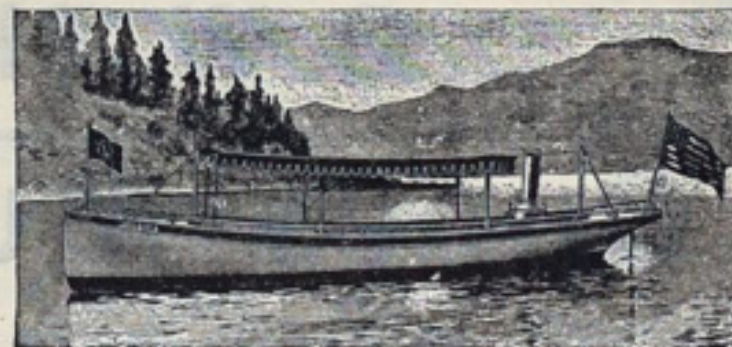
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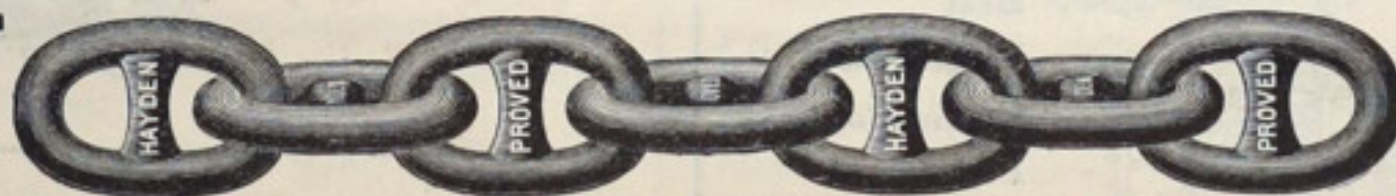
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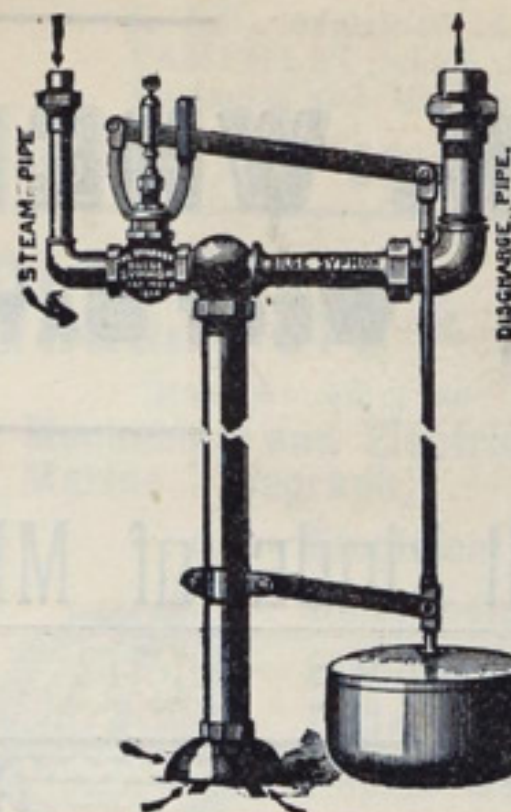


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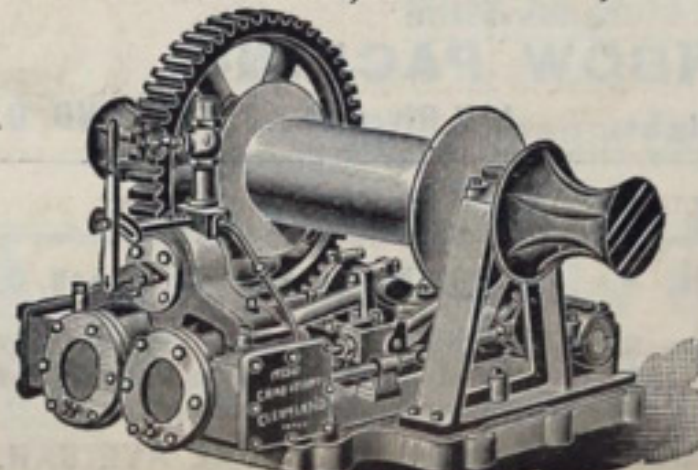
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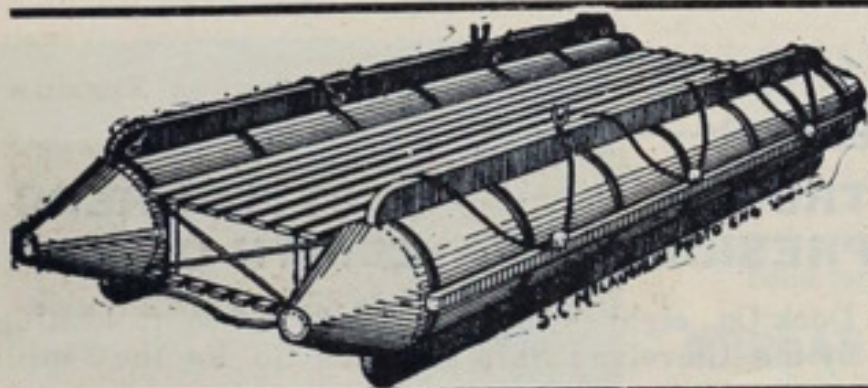
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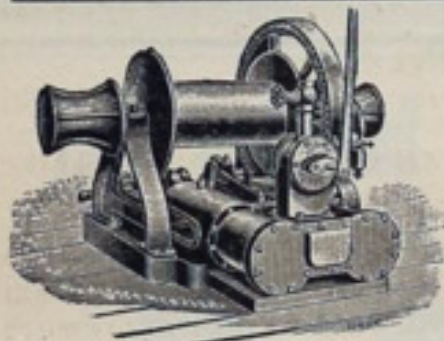
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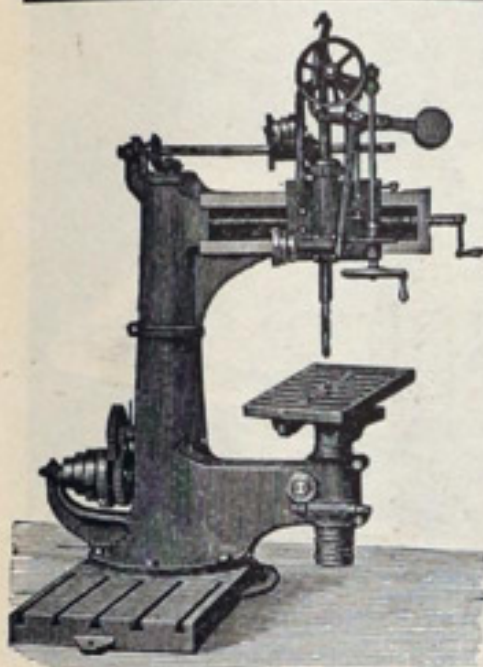
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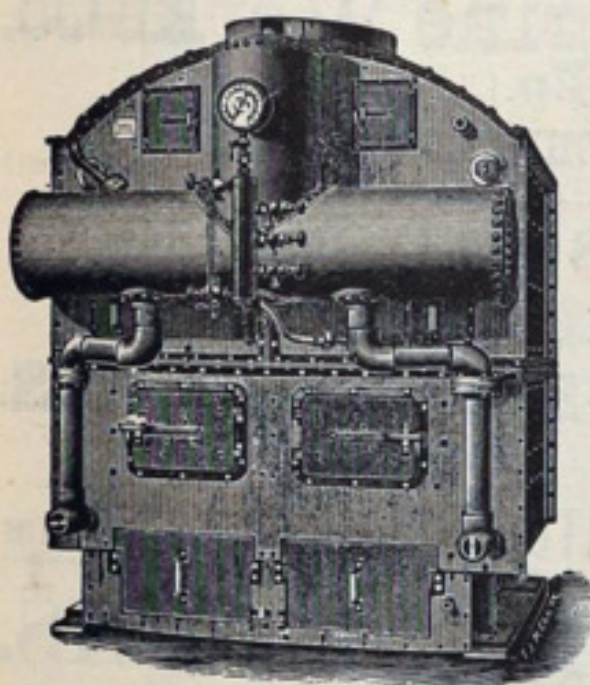
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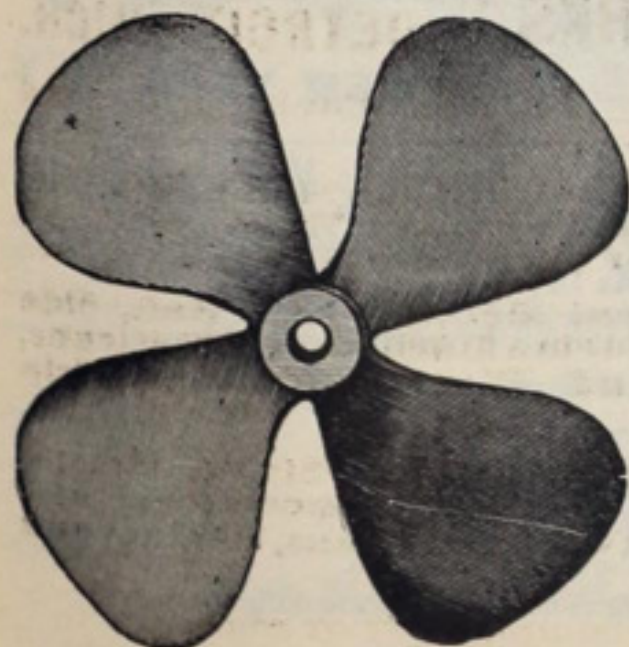
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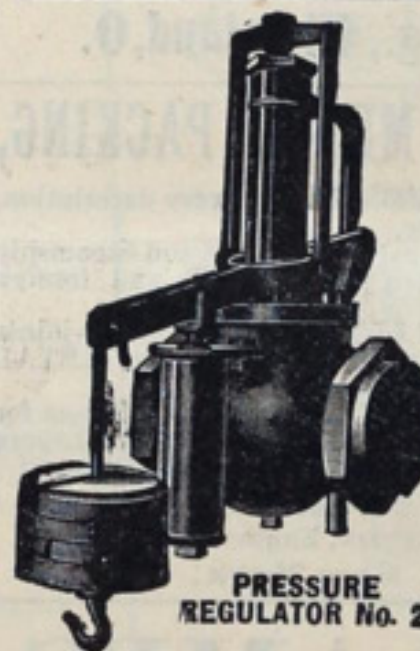
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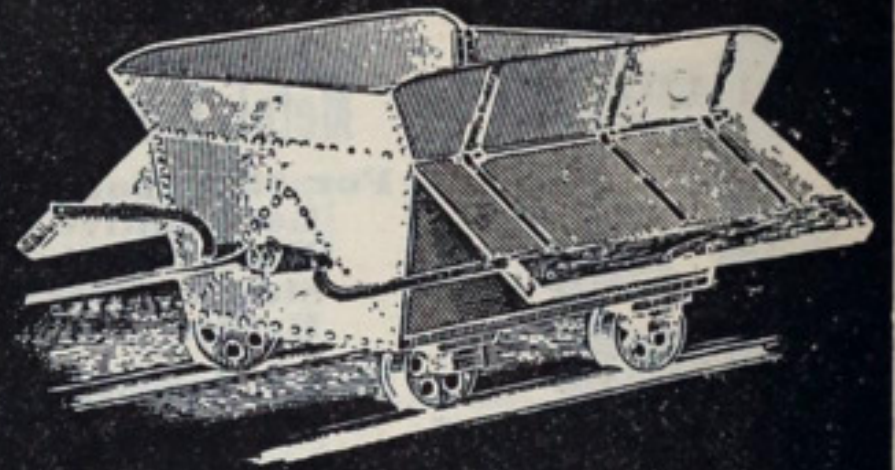
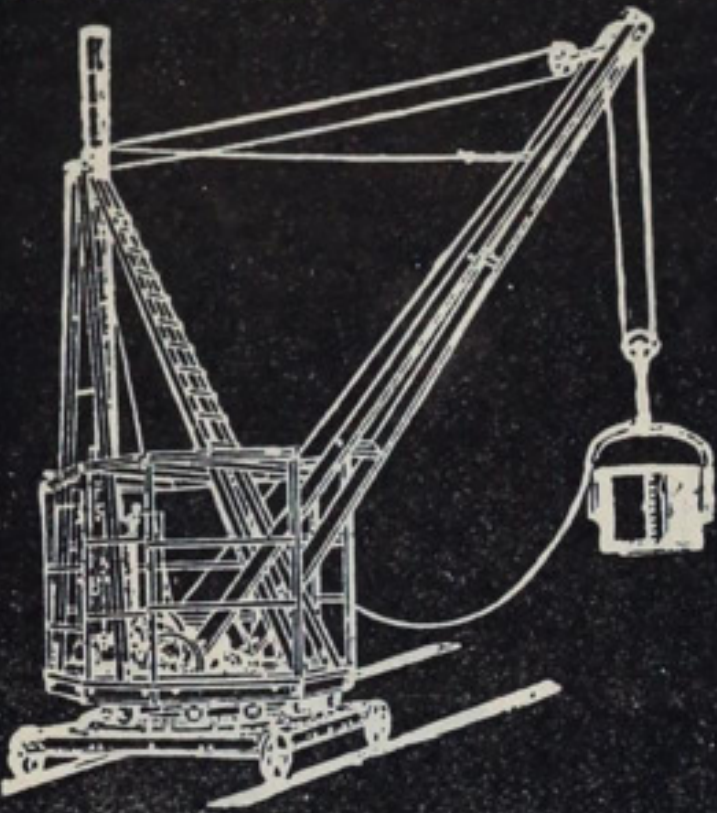
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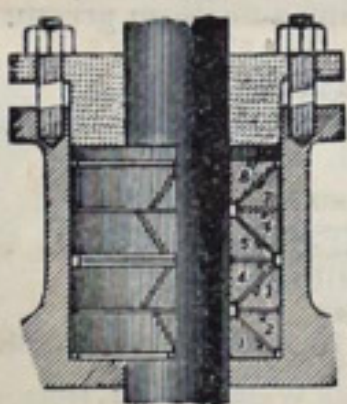
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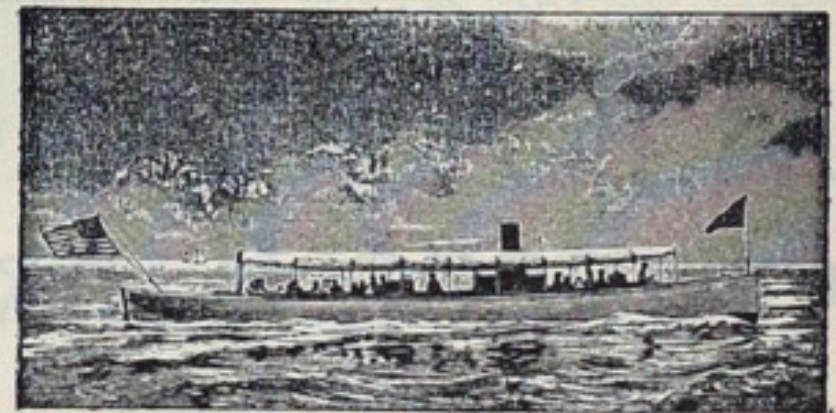
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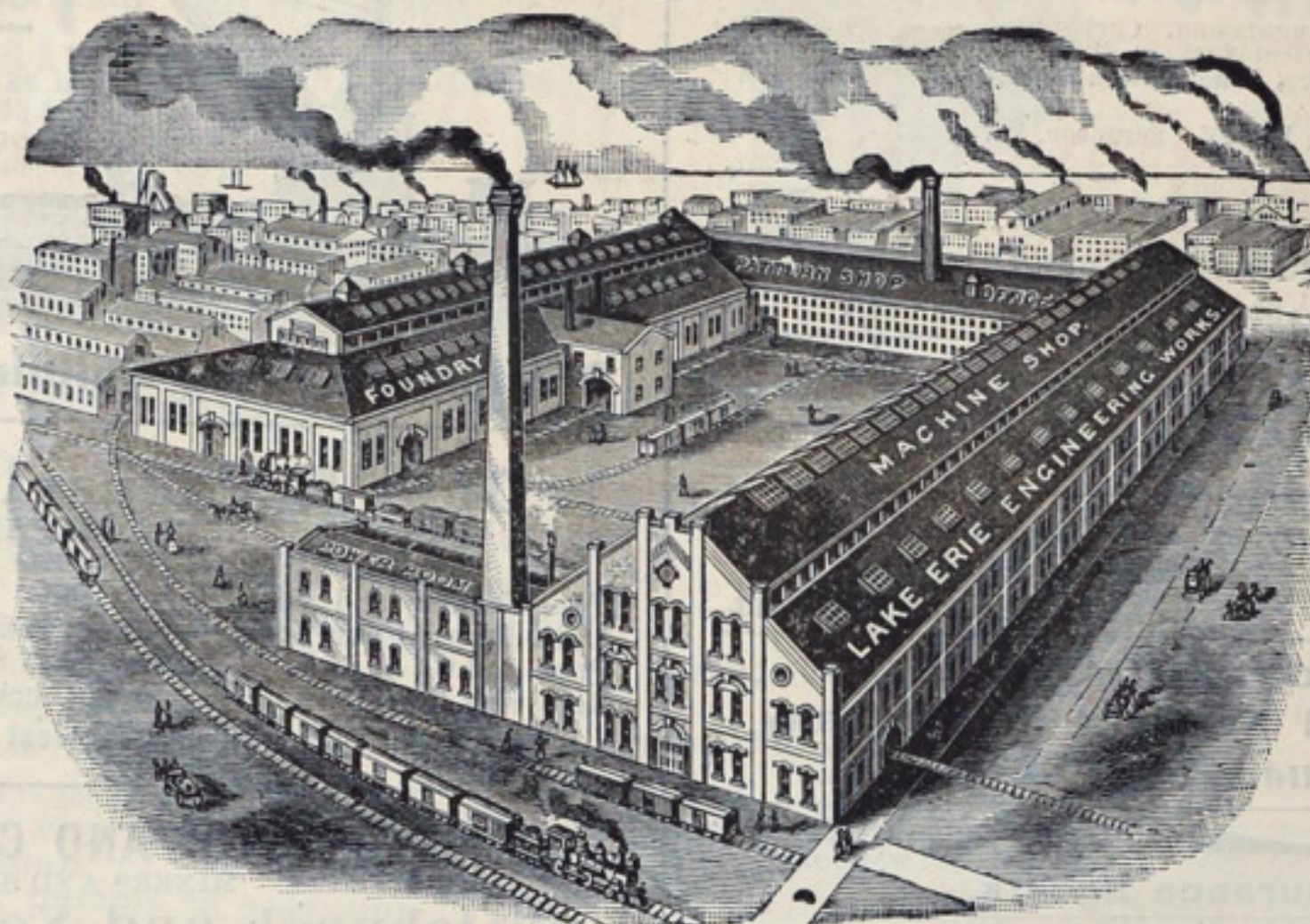
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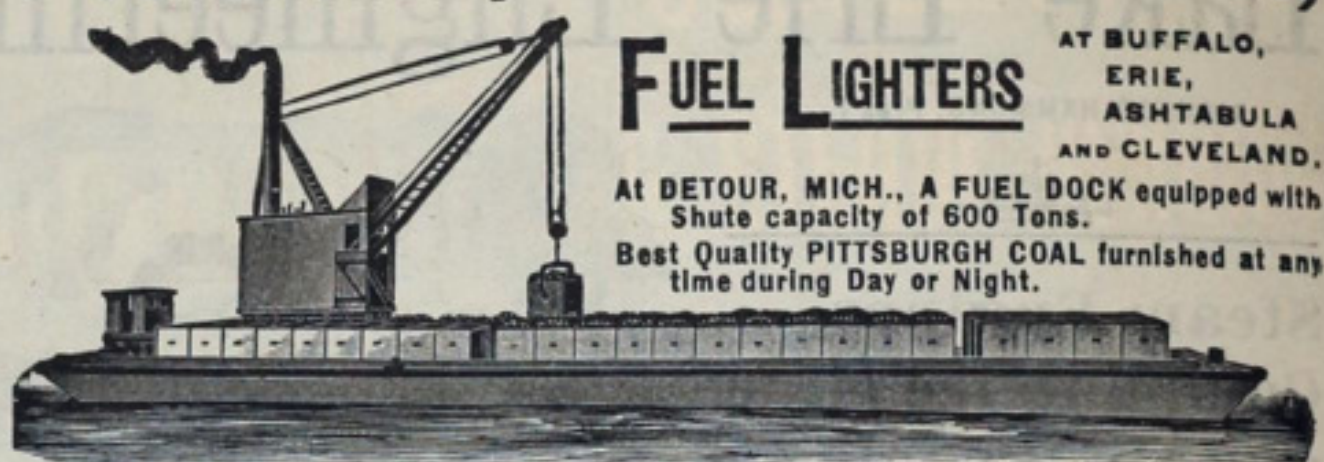
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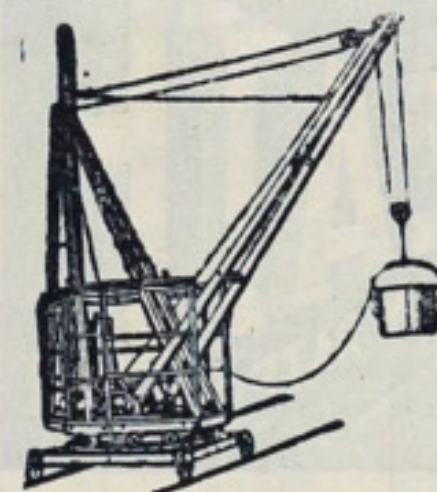
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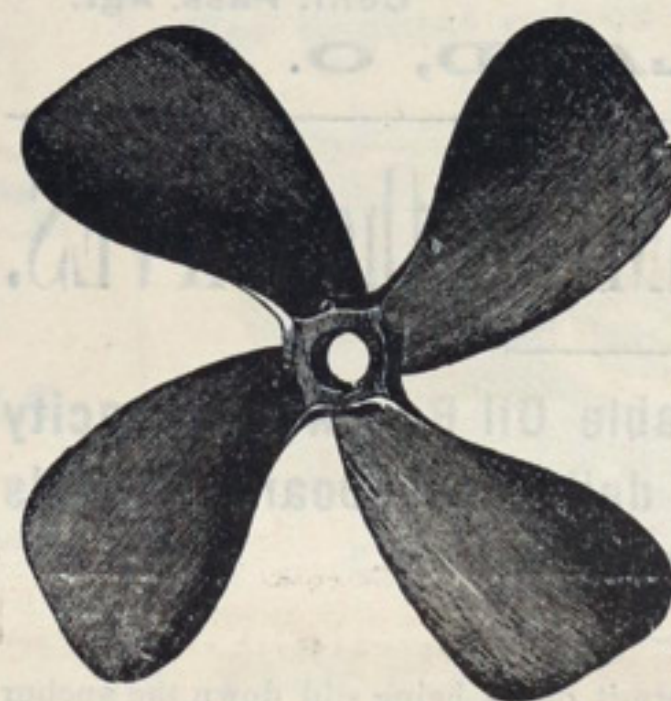
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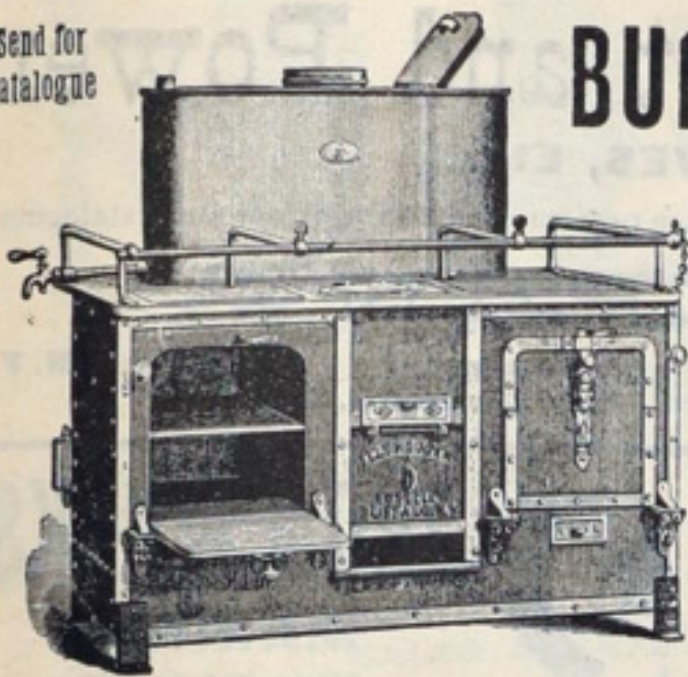


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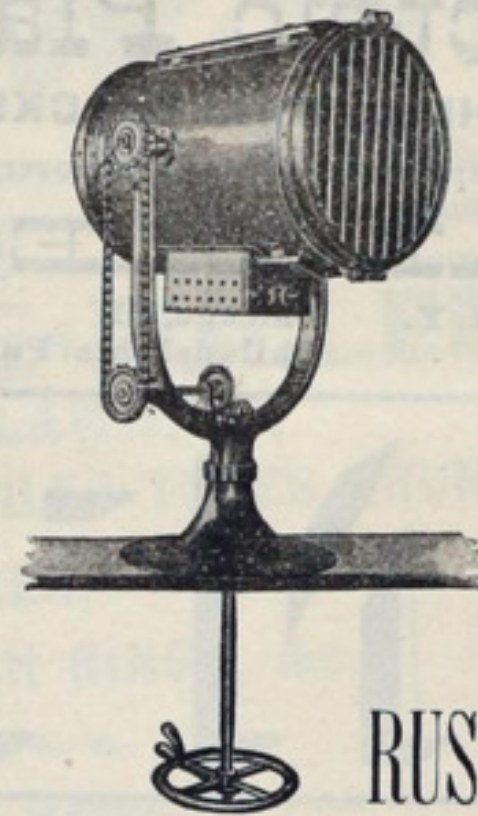
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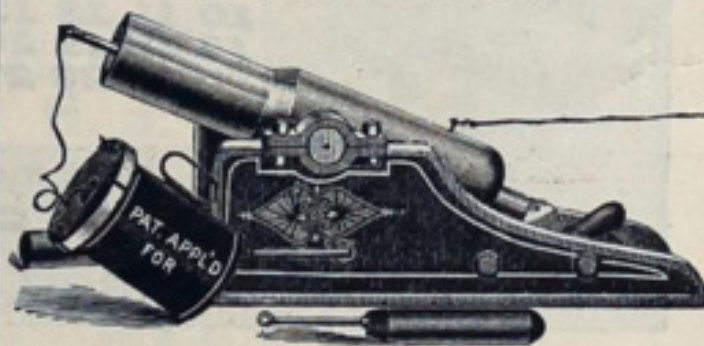
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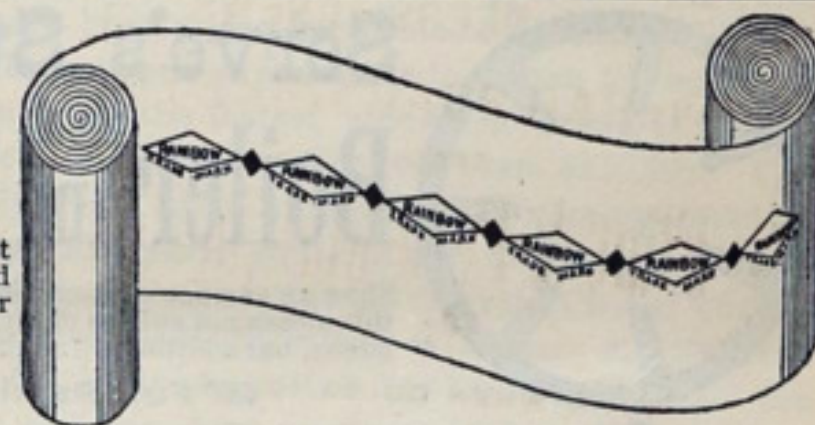
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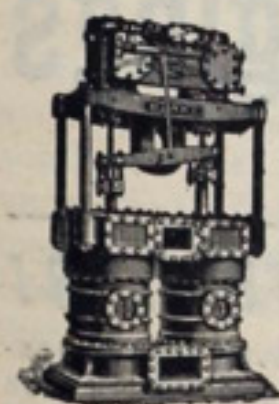
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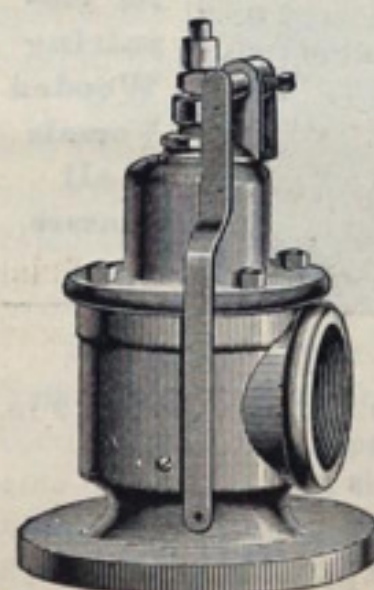
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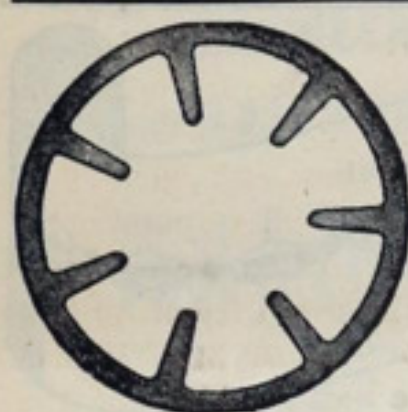
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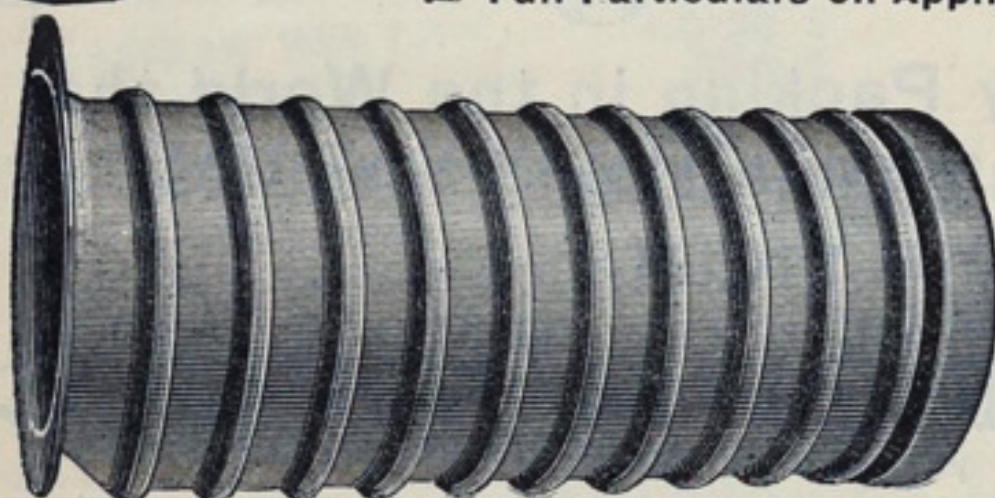
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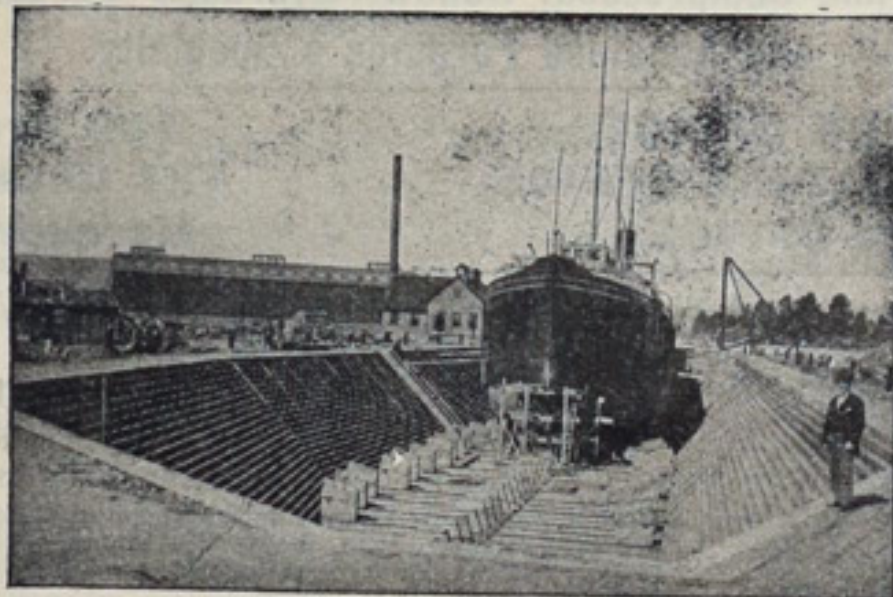
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